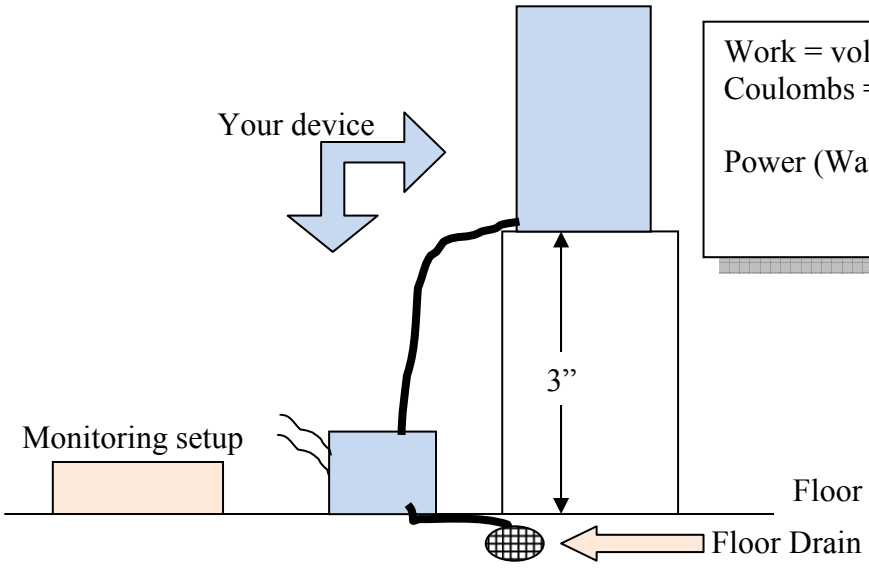
Hydroelectric Power Challenge

- Project: Design a hydroelectric generator.

- Measure the average power (watts) produced.

- Restrictions
  - The device must be small enough to transport to the competition site in a school vehicle. You must be able to bring it through a normal 3' door opening.
  - You will be given 5 minutes to assemble you device.
  - Your device will be hooked up to a monitoring setup, which will include a 10 Ω load, an ampmeter, and a voltmeter.
  - Safe operating procedures must be followed at all times.

- Challenge Parameters
  - You will be given 10 gallons of water at a 3' elevation. It will sit on top of a 3' x 2' x 2' block.
  - You may only run the 10 gallons of water through the device once.
  - Your device must be able to drain into a floor drain or acceptable catch device that will be provided.
  - Your device must be capable of connecting to a monitoring setup, which will include a 10 Ω load, an ampmeter, and a voltmeter.
  - Ten seconds after the water starts flowing you will start taking volt and amp readings. You will continue to take a reading every 30 seconds until the water stops flowing.
  - Your final reading will be the last reading taken before you run out of water.
  - You will enter your data on the excel spreadsheet on the computer provided.
  - You will not be allowed to adjust, manipulate, or program the spreadsheet.
  - You may keep a paper copy of your data.
  - The winning team will produce the highest average power reading.



Work = volts x coulombs = V x q
Coulombs = current x time = I x t

Power (Watts) = Work /time = $\frac{V \times I \times t}{t} = V \times I$